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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,196	02/18/2004	Gerard Francis McLean	1134.15A	1748

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EXAMINER
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CHUO, TONY SHENG HSIANG

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 05/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/781,196

Applicant(s)

MCLEAN ET AL.

Examiner

Tony Chuo

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 19-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-18, drawn to an electrochemical cell, classified in class 429, subclass 46.
  - II. Claims 19-28, drawn to a method of making an electrochemical cell, classified in class 429, subclass 13.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process. The electrochemical cell can be made by a process that does not treat the precursor.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

During a telephone conversation with Wendy Buskop on 5/19/06, a provisional election was made with traverse to prosecute the invention of Group I, claims 1-18. Affirmation of this election must be made by applicant in replying to this Office action. Claims 19-28 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 14 and 15 recite the limitation "substrate" in the electrochemical cell.

There is insufficient antecedent basis for this limitation in the claim. Claims 14 and 15 appear to be dependent upon claim 13.

***Claim Objections***

4. Claim 10 is objected to because of the following informalities: the word "acrylonitirle" is misspelled. Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 1-2, 4-6, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Polak et al (US 4797185) in view of Linder et al (US 5599506). The Polak reference teaches a fuel cell comprising: a first electrode "67"; a second electrode "68"; and a curable liquid electrolyte membrane "66" disposed between the first and second electrodes wherein the curable liquid electrolyte comprises: a protonic polymer having a polymeric backbone with side chains containing acidic groups for conducting protons in a fuel cell and a first vinyl monomer comprising a COOH group (See Figure 2 and column 5, line 51 to column 6, line 5). In addition, it also teaches a protonic polymer that comprises phosphoric acid (See column 6, lines 18-19). In addition, it also teaches a curable liquid electrolyte that comprises a solvent that is water (See column 6, lines 47-48). In addition, it also teaches a porous support "65", at least one channel "8" disposed in the porous support having a first channel wall and second channel wall, wherein the first electrode "67" is disposed in the first channel and the second electrode "68" is disposed in the second channel and the curable liquid electrolyte "66" is disposed in the channel (See Figures 1 and 2). However, the reference does not expressly teach a cross linking agent comprising di-vinyl sulphone. The Linder reference does teach a gel membrane where di-vinyl sulphone is used as the cross linking agent in the polymerization (See column 7, lines 20-27). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Polak electrolyte to include a cross linking agent that is di-vinyl sulphone in order to form a mechanically strong gel membrane with the proper porosity for ionic conductivity.

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7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Polak et al (US 4797185) in view of Linder et al (US 5599506) as applied to claims 1-2, 4-6, and 13-14 above and further in view of Fleischer et al (US 5741611). However, the references do not expressly teach a first vinyl monomer that is a vinyl phosphoric acid. The Fleischer reference does teach a first vinyl monomer that is a vinyl phosphoric acid that is polymerized to form a proton conductor membrane (See column 7, lines 27-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Polak electrolyte to include a first vinyl monomer that is vinyl phosphoric acid in order to form a proton conductor membrane that swells in contact with water and improves the electrical contact between the electrodes.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Polak et al (US 4797185) in view of Linder et al (US 5599506) as applied to claims 1-2, 4-6, and 13-14 above and further in view of Milliken et al (US 6399233). However, the references do not expressly teach a curable liquid electrolyte that comprises a photo-initiator. The Milliken reference does teach a polymer electrolyte that includes a photo-initiator (See column 4, line 5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Polak electrolyte to include a photo-initiator in order to shorten the curing time of the liquid polymer electrolyte.

9. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Polak et al (US 4797185) in view of Linder et al (US 5599506) as applied to claims 1-2, 4-6, and 13-14 above and further in view of Nam et al (US 2003/0219640). However,

the references do not expressly teach a curable liquid electrolyte comprising a protonic polymer that is sulphonated polyether ether ketone and an elasticizing agent that is acrylonitrile. The Nam reference does teach a proton conducting polymer membrane comprising a protonic polymer that is sulphonated polyether ether ketone and an elasticizing agent that is acrylonitrile (See paragraphs [0019],[0020]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Polak electrolyte to include a protonic polymer that is sulphonated polyether ether ketone and an elasticizing agent that is acrylonitrile in order to improve membrane conductivity, flexibility, water remaining ability, dimensional stability, and adhesion bonding ability.

10. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Polak et al (US 4797185) in view of Linder et al (US 5599506) as applied to claims 1-2, 4-6, and 13-14 above and further in view of Puffer et al (US 3403054). However, the references do not expressly teach first and second spacers connected to the first and second electrodes wherein the curable liquid electrolyte is disposed between the first and second spacers and an injection port disposed between the first and second electrode forming a cavity wherein the curable liquid electrolyte is disposed in the cavity. The Puffer reference does teach first and second spacers "16a" & "16b" connected to the first and second electrodes "19" wherein the curable liquid electrolyte is disposed between the first and second spacers and an injection port "18" disposed between the first and second electrode forming a cavity wherein the curable liquid electrolyte is disposed in the cavity "17" (See Figure 1). Therefore, it would have been obvious to

one of ordinary skill in the art at the time the invention was made to modify the Polak fuel cell to include first and second spacers connected to the first and second electrodes wherein the curable liquid electrolyte is disposed between the first and second spacers and an injection port disposed between the first and second electrode forming a cavity wherein the curable liquid electrolyte is disposed in the cavity in order to simplify the manufacturing of the fuel cell by injecting a liquid electrolyte in between the two electrodes.

11. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Polak et al (US 4797185) in view of Linder et al (US 5599506) as applied to claims 1-2, 4-6, and 13-14 above and further in view of Mayer et al (US 6332990). However, the references do not expressly teach a substrate that comprises a carbon filled epoxy, a carbon filled polymer, a manganelli phase titanium oxide, a foam, a monolith of porous material, an aerogel, a mat, a felt, a paper, a mesh, or laminates thereof. The Milliken reference does teach a substrate that is a carbon aerogel mixed with polymers (See column 3, lines 56-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Polak electrolyte to include a substrate that is a carbon aerogel mixed with polymers in order to simplify the manufacturing of the substrate by allowing the precursor materials to be spread in thin films.

12. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Polak et al (US 4797185) in view of Linder et al (US 5599506) as applied to claims 1-2, 4-6, and 13-14 above and further in view of Jones et al (US 5998054). However,



the references do not expressly teach a base comprising a distribution plenum for transporting curable liquid electrolyte, at least one fluid port in fluid communication with the channel, at least one master port for receiving curable liquid electrolyte into the base, and a cap disposed over the first electrode to seal the electrode. The Jones reference does teach a base comprising a distribution plenum "134" for transporting curable liquid electrolyte, multiple fluid ports "131" in fluid communication with the channel, one master port "132" for receiving curable liquid electrolyte into the base, and a cap disposed over the first electrode to seal the electrode (See Figure 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Polak fuel cell to include a base comprising a distribution plenum for transporting curable liquid electrolyte, multiple fluid ports in fluid communication with the channel, one master port for receiving curable liquid electrolyte into the base, and a cap disposed over the first electrode to seal the electrode in order to simultaneously inject the curable liquid electrolyte into multiple unit cells in the fuel cell stack.

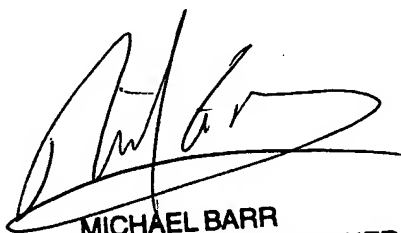
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC



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